

# Ileal perforation-etiopathology and outcome – An observational study



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## ABSTRACT

**Background:** Ileal perforations have a diverse etiology and often present with perforative peritonitis in the surgical emergency. This study is based on the scenario of management of ileal perforation encountered in a tertiary teaching hospital in West Bengal. **Aims and Objectives:** The aim and objective of this study is to document and evaluate the post-operative outcome based on the diverse etiopathology, clinical presentation, and surgical management performed in patients having ileal perforation. **Materials and Methods:** A prospective cross-sectional observational study was conducted in the Deben Mahata Government Medical College, Purulia, West Bengal, for a period of 2 years from February 2020 to January 2022 with 60 patients intraoperatively diagnosed with ileal perforation. Emergency exploratory laparotomy was done in all the cases presenting with perforative peritonitis. Ileal perforation was identified and an edge biopsy was taken. Appropriate surgical treatment in the forms of primary repair/resection-anastomosis/resection-ileostomy was done. The histopathological report was reviewed following surgery. The patients were evaluated in the post-operative period for post-operative morbidity and mortality. **Results:** Typhoid fever (68.33%) was the predominant cause in our study. The most common symptoms were abdominal pain (93%), fever (85%), and abdominal distension (75%). Widal test was performed preoperatively and was positive in 41 cases (68.33%). In our study, primary repair (58.33%), resection-anastomosis (15%), and resection-ileostomy (26.67%) were the main surgical treatment performed. Sepsis, surgical site infections (SSIs), fecal fistula, and wound dehiscence were the common post-operative complications found. Among them, SSI (51.67%) was the most common post-operative complication ( $P < 0.0001$ ) found and fecal fistula was the most dreaded post-operative complication with 50% mortality. Histopathological reports following surgery showed cases were mainly due to enteric fever (51.67%) and tuberculosis (25%). **Conclusion:** Early surgical intervention was the mainstay of treatment of ileal perforation. Delayed presentation of perforation is responsible for the development of surgical site infections (SSIs). Uncontrolled generalized sepsis, wound dehiscence, and fecal fistula were the main causes of post-operative mortality.

**Key words:** Enteric perforations; Tubercular perforations; Ileal perforative peritonitis; Ileostomy

## INTRODUCTION

Ileal perforation is a frequently encountered surgical emergency in developing countries.<sup>1</sup> The disease has an abrupt onset and a rapid downhill course with high mortality and morbidity if not treated early.<sup>1</sup> Typhoid Ileal perforation is the most common cause of ileal perforation followed by tubercular perforation.<sup>2</sup> Among

the other causes ileal perforation due to abdominal trauma, intestinal obstruction followed by ileal perforation (e.g., intussusception, adhesion, bands, worm, and diverticulosis), and malignant perforation (e.g., lymphoma) needs to be mentioned. The patients usually present with a history of acute abdominal pain, vomiting, and fever and clinical findings of tachycardia, tachypnea, abdominal tenderness with guarding, rigidity, etc.<sup>2</sup> Emergency exploratory

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laparotomy and closure of perforation is the mainstay of treatment when a hollow viscus perforation is diagnosed on an erect X-ray abdomen.<sup>2</sup> Although the mortality rates due to ileal perforation have largely come down owing to an early diagnosis and treatment, the morbidity resulting from the condition and concomitant surgery still remains high.<sup>3</sup>

The optimal surgical treatment of ileal perforation is carried out using different procedures with variable post-operative outcomes as reported by different surgeons.<sup>4</sup> There are debatable issues regarding the best surgical procedure to be chosen and performed for a successful and early recovery. This study is based on the scenario of management of ileal perforation encountered in a tertiary teaching hospital in West Bengal.

### Aims and objectives

The objective of this study was to document and evaluate the post-operative outcome based on the diverse etiopathology, clinical presentation, and surgical management of patients having ileal perforation.

## MATERIALS AND METHODS

A prospective, cross-sectional observational study was conducted in a government medical college, a tertiary center in the district of Purulia, West Bengal, over 2 years from February 2020 to January 2022. Sixty patients presenting with clinical features of perforative peritonitis diagnosed intraoperatively having ileal perforation were included in the study.

### Inclusion criteria

Patients presenting with clinical features of perforative peritonitis and diagnosed intraoperatively having ileal perforation were included in the study.

### Exclusion criteria

Patients with hollow viscus perforation other than ileal perforation were excluded from the study.

All patients were adequately resuscitated after admission followed by an emergency exploratory laparotomy through a midline incision under general anesthesia. The perforation was identified, edge biopsy was taken in all cases. The specific procedure to be performed was chosen by the operating surgeon with a few guiding principles based on intraoperative findings. Small perforations, presenting early with minimal peritoneal contamination, and surrounding healthy tissues were treated with primary repair of perforation. Perforation was repaired in two layers. The first layer of full-thickness interrupted sutures of polyglactin 2-0 and a second layer of interrupted seromuscular suture using silk 2-0. Other cases having unhealthy, devitalized

gut, gross peritoneal contamination, and generalized sepsis were treated with resection. Resection was followed by anastomosis in two layers or double-barrelled ileostomy, depending on certain conditions. Patients presenting late with large perforations, having considerable peritoneal contamination with presence of prominent mesenteric lymphadenopathy suspicious of tubercular caseation were treated with ileostomy. Anastomosis was performed in the rest of the cases. A thorough peritoneal lavage was given in all cases. The abdominal wound was then closed in layers. The edge biopsy specimen was sent for histopathological examination. Development of immediate post-operative complications such as SSI, fever, anastomotic leak/enterocutaneous fistula, and wound dehiscence were noted. All patients were tested for the Widal test except traumatic patients and were started on anti-salmonella treatment if it was positive or if there was a strong suspicion based on intraoperative or histopathological findings. Ileal tissue and lymph node samples were also sent for tubercular culture (BACTEC) and CBNAAT to rule out abdominal tuberculosis. Patients were discharged after an average of 14 days if the post-operative period was uneventful. All patients were followed up in the surgical outpatient department for 6 months.

The demographic parameters, pre-operative clinical features, intraoperative findings, post-operative morbidity, and mortality were tabulated. Statistical analysis using P was performed.  $P < 0.05$  was considered statistically significant.

## RESULTS

All patients were followed up for post-operative complications. Among them, sepsis was seen in 25 cases (41.67%) out of which 19 cases (76%) were due to typhoid, 04 cases (16%) due to tuberculosis, and 01 case (4%) each in trauma and diverticular disease, respectively. SSI was seen in 31 cases (51.67%) which were distributed as follows – 23 cases (74.19%) due to typhoid, 05 cases (16.13%) due to tuberculosis, 02 cases (6.45%) in trauma and 01 case (3.23%) in diverticular disease. Of all post-operative complications, fecal fistula remained the most dreaded with an incidence of around 10% (6 cases) out of which 03 cases were seen following primary repair, 02 cases following resection-anastomosis, and 01 case following ileostomy. In this study, wound dehiscence was found in 12 cases (20%), among them 09 cases were male and 3 cases were female (Table 1).

In our study, biopsies from the edge of perforation from resected segment were sent for histopathology in all but traumatic cases. Out of them 31 cases (51.67%) were found to be due to typhoid, 15 cases (25%) were due to

**Table 1: Distribution of cases according to post-operative complications**

Post-operative complications	Total No of Patient (%)	P value
1. Sepsis	25(41.7)	<0.0001
Typhoid	19(76)	
TB	4(16)	
Trauma	1 (4)	
Diverticular disease	1(4)	
2. SSI (Surgical site infection)	31(51.6)	<0.0001
Typhoid	23(74.19)	
TB	5((16.13)	
Trauma	2(6.45)	
Diverticular disease	1(3.23)	
3. Faecal fistula #	6(10)	0.1870
Typhoid	2(33.3)	
TB	3(50)	
Trauma	0	
Diverticular disease	1(16.7)	
4. Wound dehiscence	12(20)	0.0020
Male	9(75)	
Female	3(25)	

#Faecal fistula in typhoid – 1 following primary repair and 1 following resection anastomosis  
#Faecal fistula in TB – 2 following primary repair and 1 following resection anastomosis  
#Faecal fistula in Diverticular disease – 1 following ileostomy

tuberculosis, 10 cases (16.67%) were due to non-specific inflammation, and 01 case (1.67%) was due to diverticular disease (Table 2).

In our study, the total number of deaths was 16 (26.66%), out of which fecal fistula was the most dreaded one having 50% mortality. Mortality due to wound dehiscence and sepsis was 41.66% and 32%, respectively (Table 3).

## DISCUSSION

Ileal perforation remains a formidable surgical condition in developing countries. The median age in our study was 21.62 years  $\pm$  8.81 (standard deviation). The range was from 04 to 45 years. The maximum number of cases, i.e., 37 cases (61.67%) were in the age group of <20 years and the rest 7 cases (30.43%) were aged between 21 and 30 years.

In this study, we have found male preponderance with male-to-female ratio of 2.5:1, which was similar to other studies.<sup>5</sup>

The clinical features in our study were similar to any other acute abdominal condition. In our study, the most common symptoms were pain in the abdomen (93%), followed by fever (85%), abdominal distension (75%), vomiting (51%), etc. Other studies have mentioned similar clinical features at the time of initial presentation.<sup>6</sup>

Radiological evidence of pneumoperitoneum was found in 70% of cases and was statistically significant ( $P < 0.0001$ ). This radiological finding has been reported by other similar studies.<sup>6</sup> The Widal test was performed on all the cases

**Table 2: Distribution of cases according to histopathological report**

HP report	Number of cases (%)	P
Typhoid	31 (51.67)	<0.0001
TB	15 (25)	
Non-specific inflammation	10 (16.67)	
Diverticular disease	1 (1.67)	
HPE normal	3 (5)	

HP: Histopathological, HPE: Histopathological examinations, TB: Tuberculosis

except the 3 (5% of total) cases of traumatic perforation. Out of 57 cases, 41 cases were positive (68.33% of total cases included in the study). This was also found to be statistically significant ( $P = 0.0101$ ).

Typhoid fever, followed by tuberculosis was found to be the predominant cause of non-traumatic ileal perforation in our study which was similar to other studies.<sup>7,8</sup> In a study of 170 patients of ileal perforation, typhoid (60%), and tuberculosis (14.7%) were found to be the leading causes of ileal perforation,<sup>8</sup> while in our study, 51.67% of cases were found to be due to typhoid and 25% cases were due to tuberculosis as reported by histopathology (Table 2). Further, in 10 cases, the biopsy report showed non-specific inflammation but had a high titer of (1:160–1:320) Widal positivity. Hence, those cases were considered perforation due to enteric fever. Hence, the overall percentage of ileal perforation due to typhoid fever increased to 68.33%.

Treatment of ileal perforation is surgery, but the preferable surgical procedure for the best outcome remains debatable. In our study, most of the cases were treated by primary repair (58.33%) followed by resection and ileostomy (26.67%), and resection and anastomosis (15%) which is similar to other studies in which primary repair was done in 53% of cases, ileostomy in 23% and resection and anastomosis in 16% of cases.<sup>9</sup> At laparotomy 48 cases (80%) had a single perforation, 11 cases (18.33%) had two perforations, and 1 case (1.67%) had more than two perforations which were supported by other studies in which out of 59 cases solitary perforation was found in 44 cases (74.58%), two perforations in 10 cases (16.95%).<sup>10</sup> The size of perforation ranged from 0.5 cm to 4 cm with a mean of  $2.1 \pm 0.7$  cm and 20–60 cm proximal to the ileocecal junction with a mean of  $38.3 \pm 9.1$  cm.

After the operation, three patients were shifted to ICU because of their moribund condition. Rest were nursed in the surgical ward. Patients were followed in the post-operative period for the development of complications.

Sepsis, SSIs, fecal fistula, and wound dehiscence were the common post-operative complications with an overall mortality of 26.66%.

**Table 3: Analysis of mortality**

Cause of mortality	Number of cases (n=60)	Number of deaths (n=16)	Percentage of mortality (overall 26.66%)
Fecal fistula	6	3	50 (overall 18.75)
Wound dehiscence	12	5	41.66 (overall 31.25)
Sepsis	31	8	32 (overall 50)

25 (41.66%) of the cases developed features of generalized sepsis in the post-operative period. While most of the cases could be cured with broad-spectrum antibiotics, eight patients expired due to uncontrolled sepsis.

SSI was seen in 31 out of 60 cases (51.67%) and was clinically significant (<0.0001). It was also noted that 18 out of 44 cases (40.91%) who were operated within 24 h of the onset of acute symptoms developed SSI, 10 out of 13 cases (76.92%) had SSI who were operated after 24 h but before 48 h, three cases out of 3 (100%) developed SSI those operated after 48 h.

Wound dehiscence developed postoperatively in 12 (20%) of cases, which were again surgically repaired. Five patients however succumbed soon after the second surgery.

Fecal fistula has been reported as the most dreaded and frequent post-operative complication by other studies.<sup>11,12</sup> Anastomotic leakage or dehiscence of the primary repair was the underlying etiology of fecal fistula formation in our study, similarly reported by other studies.<sup>11,12</sup> In our study, the fecal fistula was seen in 6 cases (10%), among them 3 cases (50%) were expired. Other studies have reported a 20% incidence of fecal fistula with an overall mortality range of 40%<sup>13</sup> (Table 1).

The overall mortality of our study was 26.66%. Fifty percentage of overall mortality was due to uncontrolled generalized sepsis, followed by wound dehiscence (31.25%) and fecal fistula (18.75%). Cases with fecal fistula had a 50% (3 out of 6 cases) mortality rate followed by 41.66% mortality rate due to wound dehiscence (5 out of 12 cases) and 32% mortality rate due to generalized sepsis (8 out of 25 cases). Other similar studies reported an overall mortality rate of 10.71% and the causes of mortality were wound infection, dehiscence, fecal fistula, etc.<sup>14</sup> The overall mortality was higher in our study probably due to cases with higher number of mortality due to sepsis, wound dehiscence, and fecal fistula (Table 3).

#### Limitations of the study

The total number of patients included in the study was only 60. Different surgeons performed emergency surgeries on the patients and the surgical procedure was chosen by the respective surgeon. Generalized sepsis could not be controlled in a number of patients, leading to a high mortality rate.

## CONCLUSION

Typhoid fever and tuberculosis constituted the bulk of cases of spontaneous ileal perforation. Early surgical intervention was the mainstay of treatment. The surgical procedure was chosen according to the intraoperative findings. The delayed presentation proved to be an important factor in the development of SSIs. Uncontrolled generalized sepsis, wound dehiscence, and fecal fistula were the main causes of post-operative mortality.

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**Authors Contribution:**

**PKM**- Concept and design of the study; **JR**- Interpretation of results, statistical analysis, and manuscript preparation; **SB**- Review of literature; **AM**- Concept, co-ordinator, and revision of the manuscript.

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